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## Foreign Intelligence Information Report

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OPERATIONS

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COUNTRY USSR

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Keylis-Borok/Expansion of Earth  
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1. The US/USSR cooperative agreement on earthquake prediction, Area IX of the 10 topics under the Environmental Agreement, is the most active and successful portion of this agreement in terms of the actual exchange of information and experience which is afforded. US scientists leading the program believe it is working out very well because the Soviets have committed a great deal of time and manpower to earthquake prediction research, and their data are enhanced by the use of US equipment.
2. In the fourth quarter of 1975 and throughout 1976, US geologists will continue observations of earthquakes in the Garm region of Tadjikistan which began in 1974. This work will be carried out jointly by Soviet and US specialists and with Soviet and US apparatus. The seismic network in Garm records small earthquakes. During this same period, seismologists from the Lamont-Doherty Geological Observatory will study earthquakes which are caused by reservoir impoundment at the Nurek Dam. Observations to record the spectra of earthquakes using a field digital recording system were begun in Garm in July 1975. Soviet scientists will visit the US during 1976 to study computer applications in the evaluation of seismic risk, prediction using stochastic analysis of deterministic models of earthquake occurrence, and statistical techniques for studying correlated earthquake events. Soviet scientists will also attend meetings in the US to examine the current seismic design of masonry structures. A proposed joint research project in masonry design is to be considered which may include analysis modeling, model tests, shaking table experiments, and explosion tests.
3. The principle problem in the exchange is that the US wishes to send scientists to the USSR for study, but the Soviets have not provided aerial photography which geologists typically need for preliminary study. Such maps are presumably available in the US, but US directors of the program do not wish to undertake any exchange work unless the Soviets acknowledge that these maps should be provided. The geologic portion has therefore been somewhat held up. The Soviet scientists are sympathetic to the US request, but appear to have been restrained by a Soviet bureaucratic rule prohibiting the provision of aerial photographs of the USSR to foreigners.
4. The majority of earthquake research in the USSR is carried out under the direction of Dr M A Sadovskiy, Institute of Physics of the Earth, Academy of Sciences. He and Dr Vladimir Isaacovich Keylis-Borok, Head of the Department of Computational Geophysics, Institute of Physics of the

1975 ENVIRONMENTAL - WGLK EARTHQUAKES

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Earth, attended the International Union of Geodesy and Geophysics (IUGG) meeting in Grenoble, France. A number of US scientists with whom Keylis-Borok had worked regard him as one of the most brilliant geophysicists in the world, and have been concerned by his absence at international meetings. He is an outspoken individual, and there was apprehension that his candor may have gotten him into political difficulty. Conversations with him were exclusively of a professional nature. He seemed at ease, and satisfied with his work. He is working on a joint project which includes two US scientists comparing algorithms for the mathematical prediction of earthquakes and computation of seismic risk. These cover parts of the western US and seismically active parts of the USSR. This work concerns the use of pattern recognition techniques for determining the relationship between earthquakes and other features eg, rugged topography, geothermal areas, active faults, etc. The research which Keylis-Borok and his US associates have done on this project is to be presented in a paper at the Meeting of an American Geophysical Union in San Francisco, California, in early December 1975. It is hoped that Keylis-Borok will attend the San Francisco meeting.

6. The US delegation took a train from Moscow to Barok, about three hundred kms north of Moscow, to the Institute for Biology of Inland Waters, Academy of Sciences. Sadovskiy was spending the summer there and had indicated that the Soviets are going to move a group of scientists from Moscow to the Institute in Barok to conduct rock magnetism research. The only study group previously located at Barok was a geomagnetic observatory, staffed by only a few individuals monitoring instruments.

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